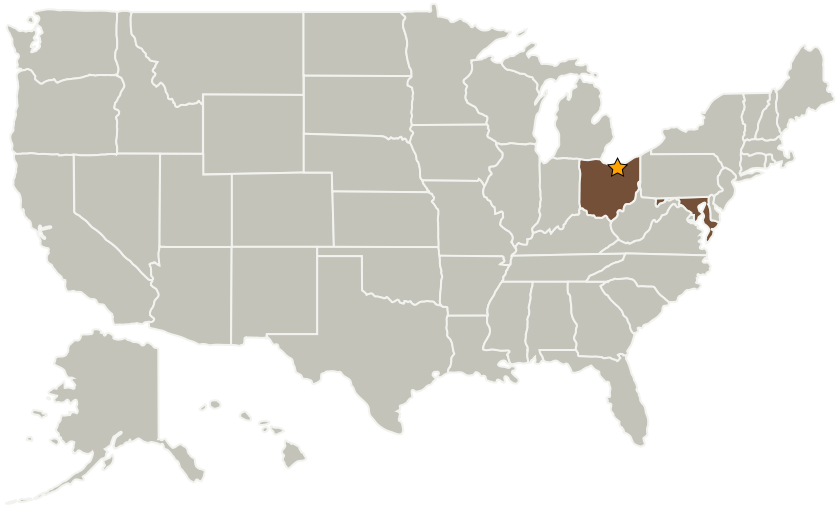
Improved CVD Coatings for NTP Fuel Elements, Phase II

Completed Technology Project (2007 - 2009)

Project Introduction

One of the great hurdles to further development and evaluation of nuclear thermal propulsion and power systems is the issue surrounding the release of radioactive material from the fuel during ground testing and its subsequent impact on test facility siting and operation. Therefore, the development of a crack resistant coating system on fuel elements for nuclear thermal propulsion that is insensitive to hydrogen corrosion and erosion is considered enabling. Ceramic Composites Inc. (CCI) proposes a systematic approach for CVD deposition and evaluation of a family of zirconium carbide (ZrC) and niobium carbide (NbC) coating systems for both uranium carbide-zirconium carbide solid solution [(U,Zr)C]-graphite composite fuel elements and advanced triple carbide (uranium carbide-ziconium carbide-niobium carbide) solid fuel elements designed for use in space nuclear power and propulsion reactors. The refractory metal coating systems developed in Phase I will be refined and an innovative deposition technique evaluated. The resulting surrogate fuel elements will be evaluated in high temperature hydrogen in concert with a more detailed performance modeling effort based on the Phase I modeling.

Primary U.S. Work Locations and Key Partners



Improved CVD Coatings for NTP Fuel Elements, Phase II

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Improved CVD Coatings for NTP Fuel Elements, Phase II

Completed Technology Project (2007 - 2009)

Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Ceramic Composites, Inc.	Supporting Organization	Industry	Annapolis, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

December 2007: Project Start

December 2009: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.4 Advanced Propulsion
    - TX01.4.3 Nuclear Thermal Propulsion